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2 May 2005

State of Louisiana
c/o Sizeler Architects Regional Design Group, LLC
Suite 200
300 Lafayette Mall
New Orleans, Louisiana 70130

Attention Mr. Ken Zito

Gentlemen:

Geotechnical Investigation
State of Louisiana
New Orleans Regional Traffic Management Center
Pontchartrain Boulevard
New Orleans, Louisiana
Eustis Engineering Project No. 18803

Transmitted are three copies (two bound and one unbound) of our engineering report covering a geotechnical investigation for the subject project.

Thank you for asking us to perform these services.

Yours very truly,

EUSTIS ENGINEERING COMPANY, INC.

CHAD L. HELD, P.E.

STATE OF LOUISIANA
CHAD L. HELD
License No. 30257
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING

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GEOTECHNICAL INVESTIGATION

STATE OF LOUISIANA

NEW ORLEANS REGIONAL TRAFFIC MANAGEMENT CENTER

PONTCHARTRAIN BOULEVARD

NEW ORLEANS, LOUISIANA

EUSTIS ENGINEERING PROJECT NO. 18803

FOR
STATE OF LOUISIANA
C/O SIZELER ARCHITECTS REGIONAL DESIGN GROUP, LLC
NEW ORLEANS, LOUISIANA

By
Eustis Engineering Company, Inc.
Metairie, Louisiana

2 MAY 2005

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INTRODUCTION

1. This report contains the results of a geotechnical investigation performed for the proposed State of Louisiana New Orleans Regional Traffic Management Center to be located in an existing lot between Pontchartrain Boulevard, West End Boulevard and Veterans Memorial Boulevard in New Orleans, Louisiana. The investigation was performed in accordance with Eustis Engineering Company, Inc.'s proposal dated 11 February 2005. The proposal was accepted on 17 February 2005 by Ms. Ryan Vosburg, representing the State of Louisiana, Department of Transportation and Development (LaDOTD). The project architects are Sizeler Architects Regional Design Group, LLC, and the structural engineers for the project are Schrenk & Peterson Consulting Engineers, Inc., both of New Orleans, Louisiana.

2. This report has been prepared in accordance with generally accepted geotechnical engineering practice for the exclusive use of the LaDOTD, Sizeler Architects, Schrenk & Peterson Consulting Engineers, and their designated representatives for specific application to the subject site. In the event of any changes in the nature, design, or location of the proposed structure, the conclusions and recommendations contained in this report will not be considered valid unless the changes are reviewed and the conclusions of this report are modified and verified in writing. Should these

data be used by anyone other than the LaDOTD, Sizeler Architects, Schrenk & Peterson Consulting Engineers, and their designated representatives, the user should contact Eustis Engineering for interpretation of data and to secure any other information pertinent to this project.

3. The analyses and recommendations contained in this report are based in part on data obtained from soil borings performed by others at the site and furnished for this investigation. The nature and extent of variations in subsoil conditions between and away from the boring locations may not become evident until construction. If variations then appear, it will be necessary to reevaluate the recommendations contained in this report.

4. Recommendations and conclusions contained in this report are to some degree subjective having partial basis in engineering judgment and experience particular to the design engineer. For this reason, this report should not be included in the contract plans and specifications. However, the furnished soil borings may be included in the plans and specifications. The construction contractor will then be obliged to make an independent interpretation of subsoil conditions at the site, and their potential impact on means and methods used to achieve the plans and specifications.

SCOPE

5. The investigation included reviewing six soil borings performed at the site by the LaDOTD. Engineering analyses, based on these available soil borings and laboratory tests, were made to determine recommendations regarding site preparation, allowable pile load capacities, estimates of settlement, pile installation procedures, and recommended pavement components and thicknesses for flexible and rigid pavements.

6. It should be noted the scope of this work does not include the investigation or detection of biological pollutants at the site. The term "biological pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and the byproducts of any such biological organisms.

SOIL BORINGS

7. The LaDOTD drilled six undisturbed soil borings at the site on 21 and 22 September 2004. Borings 1 and 2 were each drilled to depths of 70 feet below the existing ground surface. Borings 3 through 6 were each drilled to depths of 12 feet below the existing ground surface. Core boring sheets showing the results of these borings and laboratory tests were furnished to us by Sizeler Architects. These sheets indicate the latitude and longitude of each boring location. However, no location plan was furnished showing the relative locations of these borings with respect to the proposed project features. The information provided on the boring logs was used to develop recommendations provided herein. No additional test data (grain size, consolidation) were furnished for our design.

DESCRIPTION OF SUBSOIL CONDITIONS

Topography

8. Based on a site visit made by a representative of Eustis Engineering, the site is an open lot located between Pontchartrain Boulevard, West End Boulevard and Veterans Memorial Boulevard. The site currently contains multiple stockpiles of crushed asphalt and crushed concrete debris extending approximately 3 to 10 feet above the existing ground surface. It is not known if these stockpiles were present at the site when the soil borings were performed. The site has previously been utilized as a construction staging area. Several large trees were also observed on the site.

Stratigraphy

9. Reference to the logs of the furnished core boring sheets shows the borings initially encountered interbedded layers of extremely soft to soft brown and gray clay, sandy clay, and silty clay and loose to medium dense brown and gray clayey sand, silty sand, and sand to the approximate 9 to 12-ft depths in Borings 1 and 2 and to the termination depth of Borings 4 through 6 at 12 feet below the existing ground surface. These surficial materials contained gravel, shells, brick, wood, reclaimed asphalt and concrete, and glass. At Boring 3, gravel, shells, and sand were encountered at the ground surface underlain by extremely soft gray elastic silt with organic matter to the 9-ft depth. Very soft gray silty clay with silty sand layers was then encountered to the 12-ft depth where Boring 3 was terminated. From the 9 to 12-ft depths in Borings 1 and 2, loose to very dense gray sand and silty sand with trace of shells continues to the approximate 45-ft depth. Medium stiff to stiff gray clay or silty clay and very loose to loose gray sandy silt or silt continue to the termination of Borings 1 and 2 at depths of 70 feet below the existing ground surface.

Ground Water

10. The furnished core boring sheets indicate ground water was observed at the 5 and 7-ft depths at Borings 2 and 1, respectively, during the LaDOTD's field investigation. The depth to ground water will vary with climatic conditions, site drainage, and other factors. For this reason, the depth to ground water should be determined by those persons responsible for construction immediately prior to beginning work.

FOUNDATION ANALYSIS

Furnished Information

11. The proposed New Orleans Regional Traffic Management Center is proposed to be a two-story steel framed building with approximate plan dimensions of 120' x 170'. The building will be constructed with a parking area consisting of 125 spaces for passenger vehicles. No more than 12 inches of fill will be placed at the site. Maximum column loads may range from 45 to 133 kips.

Foundation Recommendations

12. Due to the variability and compressibility of the near surface soils, we recommend the building be supported on a foundation comprising driven timber piles. Based on the anticipated column loads, these timber piles may be seated in the shallow sand deposits. However, due to variations in the relative density of the sand depositis which underlie the surficial fills, variations in the pile tip embedments across the foundation should be anticipated. We recommend an extensive test pile program be undertaken to verify installation criteria and job pile lenghs. A discussion of pile foundations follows in this report.

13. A boring plan was not provided to Eustis Engineering. In addition, near surface materials are not well defined by the furnished borings. Assuming the deep borings are sufficiently dispersed within the building footprint, these considerations should not adversely effect recommendations for pile foundations. However, they could affect recommendations for pavements and estimates of settlement for filled areas. We, therefore, recommend boring locations be provided to Eustis Engineering and additional shallow borings be made to better define these materials. The number and depth will depend on the provided boring locations.

Site Preparation

14. Drainage During Construction. The initial step to prepare the site for construction should be to establish adequate temporary and permanent drainage to prevent ponding of water and ensure immediate runoff of all rainfall. It is strongly recommended the contractor maintain adequate surface drainage away from all foundation and pavement areas during and after construction. This may be accomplished by utilizing existing drainage features and by setting grades to ensure positive drainage of water away from the foundation areas. Sumps and pumps may be required to remove rainfall and ground water from shallow excavations. During construction, the contractor should exercise caution during those times in which the subgrade may be saturated to ensure soil support is not degraded by construction operations. Wheeled or tracked construction equipment exerting excessive ground pressures should not be used during times in which the subgrade may be saturated or may become saturated.

15. Permanent Drainage. The near surface soils are subject to a reduction in shear strength and excessive settlement if the moisture content of these soils increases (naturally or as a result of construction operations). It is strongly recommended adequate permanent drainage be provided to collect all rainfall away from the building foundation and pavement areas after completion of construction. All downspouts draining rainfall from the building's roof should be connected to pipes which discharge into a drainage system. Water should not be allowed to collect near the foundation and pavement areas. Poor drainage will cause a reduction in the service life of the pavements.

16. Clearing and Stripping. The area within the footprint of the proposed building and pavements should be stripped of vegetation, loose topsoil, debris, trees, stumps, organic matter, and any other deleterious materials. Stripping should be to a depth necessary to remove vegetation and roots and reach firm undisturbed soil. Based

on the furnished boring logs and our observations of stockpiled materials, variability within site fills should be anticipated. Thus, the exact depth of stripping should be determined during construction. Clearing and stripping operations should also comply with Section 201 of the Louisiana Standard Specifications for Roads and Bridges, 2000 edition (LSSRB).

17. Proofrolling. After the stripping and clearing operations, the exposed surface within pavement areas should be proofrolled with a bulldozer or tracked vehicle having an operating weight between 75 and 90 kips and a ground pressure between 10 and 15 psi. Alternative proofrolling techniques may be proposed, but these methods should be approved by Eustis Engineering prior to their use at the site.

18. Subgrade Preparation. Any depressions, stump holes, or weak areas identified by clearing, stripping, or proofrolling operations should be thoroughly cleaned out to the surface of firm undisturbed soil and backfilled with a select structural fill material placed and compacted under controlled conditions. ***All clearing, proofrolling, and compaction operations should be performed only during periods of dry weather.*** Motorized wheeled equipment should not be allowed within the foundation areas during periods of inclement weather to prevent rutting of the subgrade.

19. If proofrolling operations indicate poor subgrade conditions are present at the stripping depth over the majority of the pavement area, Eustis Engineering should be contacted to develop additional requirements for subgrade preparation. These requirements may include additional excavation and replacement with structural fill, lime or cement treatment of the subgrade, or the use of reinforcing geosynthetics. The specific technique to be used will be dependent upon the climatic conditions and drainage at the site and upon the construction equipment and techniques being used by the contractor. Otherwise, the stripped and cleared ground surface should

be backfilled with structural fill once proofrolling indicates the subgrade is sufficiently stable.

20. Structural Fill. A select granular material, such as locally available pumped river sand, should be used as backfill and/or fill required to reach design grade. Sand fill should be non-plastic and meet the requirements of granular material outlined in Section 1003.07 of the LSSRB.

21. Compaction. Structural fill used to provide a surface for the forming of the pile supported building features may be spread in loose lifts of 8 to 10 inches. Each lift should then be compacted to at least 95% of its maximum dry density in accordance with ASTM D 698. Structural fill used as subbase beneath pavements should be placed in 6 to 8-in. thick lifts and compacted to at least 95% of its maximum dry density near optimum water content in accordance with ASTM D 1557.

22. Quality Control. Density tests should be performed on each lift of the compacted structural fill to determine if the contractor has achieved the recommended density. We recommend a minimum of two inplace density tests be performed at randomly selected locations within each lift of structural fill. Additional testing may be required in areas where there is an apparent change in quality of fill, effectiveness of compaction, or moisture levels in the compacted material.

Fill Settlement

23. We estimate the placement of backfill and 12 inches or less of site fill will have minimal effects on pile supported structures for the project. Should more than 12 inches of fill be required to reach finished grade, Eustis Engineering should be contacted to reevaluate settlement due to fill placement.

Pile Foundations

24. Allowable Pile Load Capacities. Analyses have been made to determine the estimated allowable single pile load capacities in compression and tension for various sizes of treated ASTM D 25 quality timber piles for support of the proposed structure. The results of these analyses are tabulated on Figure 1.

25. Our allowable pile load capacities neglect the capacity within the uppermost 2 feet for embedment of the pile within a pile cap. These allowable pile load capacities also contain an estimated factor of safety of 2 against failure of a single pile through the soil. Use of this factor of safety assumes a pile load test will be performed. Furthermore, pile capacities are based on the borings judged to provide the weakest foundation conditions. Given the variation in relative density of the sand deposits present between the 12 and 45-ft depths, variations in driving resistances, refusal embedments, and capacities may be experienced. In this regard, the allowable pile load capacities and installation requirements should be verified by a test pile program as discussed subsequently in this report.

26. Timber Piles. We recommend the treatment of timber piles meet the current American Wood Preservers Association Standards as outlined in Section 1014 of the LSSRB for both preservative and quality assurance. Treatment should also follow Section 812.06 where applicable. Furthermore, we recommend the timber piles meet the quality (clean peeled, straightness, etc.) requirements outlined in ASTM D 25 and size requirements outlined in Table 1014-1 of the LSSRB. The pile dimensions assumed in our analyses are provided on Figure 1.

27. Structural Capacity. Analyses for pile capacities are based on a soil-pile relationship only. Therefore, the structural capacity of the piles and their connections to transmit these loads should be determined by a structural engineer.

28. <u>Pile Group Capacity and Spacing.</u> Timber piles firmly embedded in the sand deposits will derive a majority of their supporting capacity from end bearing; therefore, it is not necessary to consider the effect of group action with regard to the compressive capacity of these piles. The minimum spacing between individual timber piles should be at least 3 feet. The minimum spacing between rows or groups of piles should also meet the assumptions for settlement provided in the following paragraphs.

29. <u>Estimated Settlement Due to Structural Loads.</u> We recommend slabs be cast monolithically with grade beams and be rigidly connected to pile caps to minimize the potential for differential settlements. We estimate timber piles driven to tip embedments of 15 to 30 feet below the ground surface, firmly embedded in the dense sand deposits, will settle ¼ to ½ inch due to structural loads. These estimates do not include elastic deformation of the piles which should be added to the settlement estimates. Elastic deformation of the piles may be estimated as 67% to 75% of the static column strain of a pile acting as a column. These estimates of settlement are due to structural loads only.

30. Our estimates of settlement are based on the assumption piles will be driven in small groups or widely spaced rows. We have assumed the largest group dimension will be no greater than 20% of the pile length and the center to center spacing between groups will be no closer than twice the largest group dimension. We have assumed the center to center spacing between rows of single piles will be no closer than 8 feet. In the event any of our assumptions are not met, Eustis Engineering should be contacted to evaluate the potential settlement of the pile foundations.

31. <u>Differential Settlement.</u> Your design should recognize the potential for differential settlement between pile supported features and grade supported features. A structural joint or flexible connection considering these movements should be

provided between any grade supported and pile supported features to accommodate potential differential settlement.

32. Slab. A Visqueen vapor barrier should be provided beneath concrete floor slabs to prevent capillary migration of moisture. These slabs should be cast monolithically with grade beams which, in turn, are structurally connected to the pile caps to provide rigidity and minimize the potential for differential settlement.

Installation of Driven Piles

33. Quality Control. Close field supervision should be maintained by experienced personnel to ensure proper procedures are followed and accurate records are kept for all pile driving operations. The driving record should include, as a minimum, the date, pile type, overall length, tip and butt diameters, embedment below finished grade, hammer type, and the number of blows per foot of penetration. An accurate driving record is especially important to verify the piles are installed to the required tip embedment at penetration resistances indicative of dense sand deposits, and to give an indication of any unusual driving characteristics which may indicate pile breakage.

34. Hammers. Treated ASTM D 25 quality timber piles with minimum 8-in. tips and 12-in. butts should be driven with a drop hammer or single acting air hammer having a manufacturer's rated energy of 15,000 ft-lbs per blow. If a drop hammer is used, the ram weight should not exceed 5,000 pounds and the drop should not exceed 3 feet.

35. Prepunching or Predrilling. Prepunching or predrilling to a depth of 5 to 10 feet may be required to assist pile driving through surficial fill materials. A pilot hole has the potential of minimizing vibrations resulting from pile driving operations or reducing the potential damage to timber piles. The prepunch or predrill bit should

be no larger than the pile tip diameter. A steel mandrel should be used for prepunching. Predrilling through surficial materials may be by dry auger methods. Actual requirements should be determined during a test pile program.

36. Pile Refusal. Refusal criteria for the timber piles may be taken as 25 blows per foot with the recommended hammer to minimize damage to these piles. If the piles are driven with the aid of a follower, or if the pile driving helmet is allowed to impact the ground surface, Eustis Engineering should be consulted to adjust these refusal criteria. Densification of the loose sand deposits, as a result of pile driving operations or natural variations in the sand deposits, may result in variable penetration resistance and pile refusal across the site. Therefore, Eustis Engineering should be contacted if piles do not achieve the desired embedment.

Test Piles and Load Tests

37. Eustis Engineering considers a test pile program and load test as an extension of our geotechnical investigation. Therefore, Eustis Engineering should be retained to perform these services. Considering variations in the sand deposits across the site, a minimum of five test piles of the size and length proposed for use, one at each corner of the proposed building and one at the building center, should be installed for the project to verify installation requirements, anticipated job pile lengths, and the estimated pile capacity.

38. The test piles should be the same type and embedment anticipated for the job piles and installed with the same equipment and techniques proposed for the job piles. The test piles can be used to evaluate installation methods. Driven test piles will provide more definitive information regarding the anticipated driving resistance and vibrations from pile driving.

39. The test piles should be allowed to set for at least 14 days subsequent to the installation of the reaction system. The test pile with the lowest penetration resistance as determined from blow count records should then be load tested to failure in accordance with ASTM D 1143 and the New Orleans Building Code. The results should be evaluated by Eustis Engineering to verify the estimated pile load capacities presented in this report.

Vibrations

40. Pile driving, as well as other construction activities, has the potential to generate vibrations that may affect nearby structures, pavements, and underground utilities. Eustis Engineering recommends vibrations be monitored during the test pile program and during subsequent construction activities of concern. This monitoring should evaluate peak particle velocities during pile driving at critical structures with a seismograph, as well as other construction activities generating vibrations (hauling of fill, moving heavy equipment, etc.). The record of peak particle velocities will provide information in assessing potential damage and the need for changes in construction operations.

41. Peak particle velocities (measured at a structure) exceeding 0.5 in./sec may induce damage to the structure, particularly when this structure has been previously stressed by settlement or other movements. Peak particle velocities between 0.25 and 0.5 in./sec may be sensed as being detrimental by human perception. Densification of loose cohesionless soils could result in settlement and subsequent damage to pavements, structures, or utilities founded in or above these materials. If sustained vibration levels of 0.25 in./sec are measured at a structure, pavement, or utility of concern, Eustis Engineering should be notified, the construction operations generating these vibrations should be terminated, and consideration given to altering these procedures.

Pavements

42. Traffic. Based on furnished information, the parking area will have approximately 125 parking spaces. No traffic volumes were furnished. Therefore, we have assumed the parking area will experience 63 passenger cars and 63 pickup trucks, vans, and sports utility vehicles per day. We estimate driveways and serviceways will experience two times this amount of traffic with five additional delivery trucks per day, and two garbage trucks per week. The assumed axle weights are tabulated below.

TYPE OF VEHICLE	AXLE LOAD IN KIPS	
	FRONT	REAR
Passenger Cars	2(S)	2(S)
Pickup Trucks, Vans, or Sports Utility Vehicles	2(S)	5(S)
Delivery Truck	12(S)	20(S)
Garbage Truck	20(S)	44(T)

(S) Single Axle Load (T) Tandem Axel Load

43. Our assumed traffic intensities should be verified prior to implementation of our recommendations in the design. If traffic conditions are different than those presented, Eustis Engineering should be contacted to reevaluate the pavement recommendations contained in this report. These traffic data assumptions were converted to equivalent 18-kip single axle loads (E_{18}) using AASHTO equivalency factors for flexible and rigid pavements. A 20-year design life and a terminal serviceability index (P_t) of 2.0 were used for the analyses of rigid and flexible pavements. Trash container pads should be rigid pavement slabs.

44. Method of Analysis. The pavement components and thicknesses for rigid and flexible pavements were determined using methods presented in the AASHTO

Guide for Design of Pavement Structures. The resilient soil modulus (M_r) of the subgrade was estimated based on the type of soil, probable drainage conditions, and engineering experience. For these estimates, we have assumed the subgrade is prepared as recommended in this report. In particular, proper drainage during construction and adequate permanent drainage should be provided so the subgrade is not allowed to become saturated.

45. Flexible Pavement. Our analyses assume all paving materials will conform to the LSSRB. For the parking areas, we recommend 3 inches of hot mix asphaltic surface course consisting of at least 1.5 inches of Type 3 wearing course and 1.5 inches of Type 3 binder course. In addition, we recommend 6 inches of stone base course and 8 inches of sand subbase. For the driveways and serviceways, we recommend 5 inches of hot mix asphaltic surface course consisting of at least 2.5 inches of Type 3 wearing course and 2.5 inches of Type 3 binder course. In addition, we recommend 8 inches of stone base course and 12 inches of sand subbase.

46. The asphaltic surface course should conform with Section 501 of the LSSRB. The material for the crushed stone base course should conform to the material requirements of Section 1003.03(d) of the LSSRB. The stone base course should be placed and compacted in accordance with Section 302 of the LSSRB for a Class II base course. Sand subbase should follow the recommendations given in "Structural Fill" of this report. Structural fill used as subbase should be placed in 6 to 8-in. loose lifts and compacted to at least 95% of its maximum dry density in accordance with ASTM D 1557.

47. Grades should provide for adequate drainage to prevent saturation of the subgrade and base course materials. If the new pavement components require extensive cut beneath existing grade and the exposed subgrade is very soft and highly compressible, Eustis Engineering should be consulted to determine if additional

measures, such as lime or cement treatment of the subgrade or the use of reinforcing geosynthetics, need to be implemented in the pavement design.

48. Rigid Pavement. Using the same soil and traffic conditions, Eustis Engineering recommends rigid pavement for the parking lot should comprise 5 inches of Portland Cement Concrete. The driveways and serviceways should comprise 7 inches of Portland Cement Concrete. We recommend trash container pads be at least 8 inches in thickness. Portland Cement Concrete should conform to the material requirements for pavement Type B concrete as specified in Section 901 of the LSSRB. The concrete should have a specified 28-day compressive strength of 4,000 psi to give the pavement adequate flexural strength. The concrete pavement should also be wire mesh reinforced against temperature and shrinkage and should be constructed in accordance with the provisions of the LSSRB, Section 601. The concrete should be underlain by at least 8 inches of compacted sand fill. The sand fill should conform to the material requirements given in "Structural Fill." The sand subbase should be compacted to at least 95% of its maximum dry density near optimum water content using ASTM D 1557.

49. Grades should provide for adequate drainage to prevent saturation of sand fill beneath the pavement. All joints should be sealed to prevent infiltration of water. All pavement details, such as wire mesh, reinforcement, dowels, joints, curbs, etc., should be designed by a pavement design engineer.

50. Areal Subsidence. The project area is being affected by ongoing areal subsidence that is the result of past filling, drawdown of ground water levels due to drainage improvements, and biodegradation of near surface organic soils subsequent to ground water drawdown. The amount of future subsidence cannot be estimated from information developed for our report. Settlement of surface founded structures and pavements due to subsidence can be several inches and differential over short lengths and with respect to pile supported structures.

GEOTECHNICAL SERVICES DURING CONSTRUCTION

51. In order to provide continuity between the investigation, design, and construction phases, Eustis Engineering should be retained to review plans and specifications developed for the project and all contractor submittals related to geotechnical issues and foundations. Eustis Engineering can also provide additional geotechnical services which may include consultation during design and construction. We can also provide steel, concrete, and asphalt inspection services, and compaction and inplace density determinations on fill materials. We can perform appropriate laboratory tests to determine the gradation and quality of material proposed as structural fill or backfill. Eustis Engineering can also log the installation of test piles and job piles, perform and evaluate pile load tests, and monitor vibrations.

52. Eustis Engineering should be retained to monitor the geotechnical related work performed by the contractor. This permits the geotechnical engineer that prepared the report to be on hand to quickly evaluate unanticipated conditions, conduct additional tests if required, and, when necessary, recommend alternative solutions to problems. This is recommended to avoid major construction cost overruns or contractual disputes on the project.

STATE OF LOUISIANA
NEW ORLEANS REGIONAL TRAFFIC MANAGEMENT CENTER
NEW ORLEANS, LOUISIANA

ESTIMATED ALLOWABLE SINGLE PILE LOAD CAPACITY
ASTM D 25 QUALITY TIMBER PILES
FOR SUPPORT OF THE NEW ORLEANS REGIONAL TRAFFIC MANAGEMENT CENTER

PILE TYPE	PILE SIZE IN INCHES	PILE TIP EMBEDMENT BELOW EXISTING GROUND SURFACE IN FEET	ESTIMATED ALLOWABLE SINGLE PILE LOAD CAPACITY IN TONS FACTOR OF SAFETY ≈ 2[(2)]	
			COMPRESSION	TENSION
Treated ASTM D 25 Quality Timber	8-In. Tip 12-In. Butt	15 to 30[(1)]	8	3

(1) Assumes piles are firmly embedded in the medium dense to dense sand layer (initially encountered at the approximate 12-ft depth at the boring locations) as indicated by an increase in penetration resistance indicative of capacity.

(2) Use of this factor of safety assumes a pile load test will be performed.

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28 September 2006

Sizeler Architects Regional Design Group, LLC
Suite 200
300 Lafayette Mall
New Orleans, Louisiana 70130

Attention Mr. Ken Zito
Email Kzito@sizeler.com

Gentlemen:

Supplemental Geotechnical Investigation
State of Louisiana
New Orleans Regional Traffic Management Center
Pontchartrain Boulevard
New Orleans, Louisiana
Eustis Engineering Project No. 18803

In accordance with our proposal dated 25 May 2005, auger borings were performed at the site to provide a more detailed subsoil classification beneath the proposed parking areas and to verify the pavement recommendations provided in our original investigation. This investigation was authorized in your email of 20 July 2006. Also authorized was a supplemental investigation to provide recommendations for three options of building and site grades developed after changes in flood maps since Hurricane Katrina. Reference is made to our original report entitled "Geotechnical Investigation, State of Louisiana, New Orleans Regional Traffic Management Center, Pontchartrain Boulevard, New Orleans, Louisiana, Eustis Engineering Project No. 18803" dated 2 May 2005.

Scope

The supplemental investigation for the pavement evaluation included the performance of six auger borings. These augment the auger borings furnished for our original investigation to further assess the subsurface conditions and stratigraphy beneath the proposed parking areas. The supplemental investigation for the alternate building grades included the performance of additional undisturbed soil borings. These borings were made to further identify variations within the surficial deposits which may affect the magnitude and rate of settlement due to fill placement. An evaluation of a preload and drag loads were also made as part of this supplement.

Field and Laboratory Services

General. Six auger borings, each 8 feet in depth, were made at the site on 29 July 2005. The auger borings are designated as A-1 through A-6 and their respective locations are shown on Enclosure 1. On 10 August 2006, five additional undisturbed borings were performed at the site. These additional borings were each made to depths of 20 feet to obtain samples of the surficial soils. The borings are designated as B-1 through B-5 and were made at the locations indicated on Enclosure 1.

Detailed descriptive logs of the auger borings and laboratory tests are shown in both tabular and graphical form in Appendix I. Detailed descriptive logs of the undisturbed borings and laboratory tests are shown in both tabular and graphical form in Appendix II. Upon completion of drilling the borings, the holes were backfilled in accordance with current regulatory requirements.

Auger Borings. The auger borings were made with an auger attached to the rear of the drill rig. The subsoils were sampled directly from the auger blades at close intervals or changes in strata. These samples were sealed in plastic bags to preserve their natural moisture content.

Undisturbed Borings. The undisturbed soil borings were made with a truck mounted rotary type drill rig. Undisturbed samples of cohesive or semi-cohesive subsoils were obtained at close intervals or changes in stratum using a 3-in. diameter thinwall Shelby tube sampler. The samples were immediately extruded from the sampler, inspected, and visually classified by Eustis Engineering's soil technician. Pocket penetrometer tests were performed on the soil samples to give a general indication of their shear strength or consistency. The results of these tests are shown on the boring logs under the column heading "PP." Representative samples were then promptly placed in moisture proof containers and sealed for preservation of their natural moisture content.

Samples of cohesionless and semi-cohesive materials were obtained during the performance of in situ Standard Penetration Tests. This test consists of driving a 2-in. diameter sampler 1 foot into the soil after first seating it 6 inches. A 140-lb weight dropped 30 inches is used to advance the sampler. The number of blows required to drive the sampler is indicative of the relative density of cohesionless soils and the consistency of cohesive soils. The samples were retained in moisture proof containers for preservation of their natural moisture content. The results of the Standard Penetration Tests are shown on the boring logs under the column heading "SPT."

Laboratory Tests. Soil mechanics laboratory tests, consisting of natural water content, unit weight, unconfined compression shear (UC) or one point confined compression shear (OB), were performed on samples obtained from the undisturbed borings. Samples obtained from the auger borings were visually classified and tested for their natural water content. In addition, Atterberg liquid and plastic limits tests were performed on selected representative samples to aid in classification of the subsoils and to give an indication of their relative compressibility. The results of the laboratory tests are summarized on the boring logs in the Appendices.

Stratigraphy

The new auger borings indicate primarily clay deposits with a few sand layers. This stratigraphy corresponds to the assumed stratigraphy in our previous report. Similarly, the undisturbed borings indicate existing fill materials extend to depths of approximately 2 to 3 feet below grade and are underlain by clay and organic clay deposits to the 10-ft depth. Loose to dense clayey sand and fine sand deposits were then encountered to the termination of these borings at the 20-ft depth. The specific lithology at each boring is shown on the individual logs.

Furnished Information

We understand the average existing site grade is at el 17.5 Cairo Datum. Grades away from the building will generally only be raised 2 feet. Three options are currently being considered for fill at the building as outlined below.

Option I: Place approximately 4 feet of fill to achieve a slab at el 22 CD.

Option II: Place approximately 8 feet of fill to achieve a slab at el 26 CD.

Option III: Raise the building slab to el 29.5 CD by providing parking beneath the building with grades being raised approximately 2.5 to 3 feet (parking slab at el 20.5 CD).

Foundation Recommendations

Based on the new auger boring data, the pavement recommendations provided in our original report remain valid. Please reference our original report for our design assumptions and construction recommendations.

The three options for building support were evaluated. Settlement will be a design consideration because of the variability and compressibility of the upper deposits as well as the proposed fill heights. However, the presence of shallow sand deposits at the site will allow a relatively short duration preload and provide acceptable residual settlements. Therefore, we recommend fill be placed as soon as possible to initiate consolidation of the upper deposits and minimize post construction settlement and drag loads. Placement of fill prior to construction will be beneficial for all three options and should be required by the specifications.

Preload/Surcharge Program

General. Consolidation of the subsoils can be expected due to placement of fill to reach finished grade. Fill placement may result in differential settlement between grade supported structures, such as pavements, and pile supported structures. Your design should recognize this potential. Fill placement will also affect pile foundations as discussed subsequently.

Fill Settlement. Our estimates of settlement due to fill placement assume the placement of 2 feet of fill over an area of 200' x 400' (entire site) with the additional fill being placed within a building footprint assumed as 120' x 170'. To account for variations in the stratigraphy across the site, two design cases were considered to model the potential differential settlement. These cases are designated by the borings which most closely resembles the model, Borings 3 and 5. Subsurface conditions below the 20-ft depth are based on the original borings at the site performed by the State of Louisiana, Department of Transportation and Development. A summary of our findings are tabulated below.

OPTION	HEIGHT OF FILL AT BUILDING PAD IN FEET	ESTIMATED ULTIMATE GROUND SURFACE SETTLEMENT IN INCHES	
		BORING 3	BORING 5
I	4	1¾ to 2½	½ to ¾
II	8	4½ to 7	1½ to 2¼
III	3	1½ to 2	½ or Less

Due to time constraints, consolidation tests were not completed at the time of this letter. Therefore, estimates of the time-rate of settlement were made based on available correlations. We estimate approximately 85% of the ultimate settlement will occur within one to three months of fill placement. Hence our recommendation to preload/surcharge the site prior to installation of piles and construction of the building. However, piles should not be installed within this fill until construction of the superstructure is ready to proceed.

Otherwise, piles may experience additional settlements or loads above the estimates provided in this letter.

These estimates of settlement are due to fill placement only and should be considered additive to settlement due to structural loads. A total unit weight of 120 pcf was assumed to estimate the load induced by the fill. These estimates of settlement do not include settlement due to ground water lowering, quality of subgrade if deteriorated by excavation, improper compaction, or additional settlement induced by other structures, pavements, or fills.

Surcharge Monitoring. During construction, we recommend monitoring be performed in conjunction with the fill placement. Settlement should be monitored at several points of concern to determine the actual rate of consolidation, verify our estimates of the settlement magnitude, and to further evaluate potential differential settlements after construction. We recommend the monitoring through the use of settlement plates and an elevation survey as described below. Based on the proposed configuration of the building, we recommend a minimum of five settlement plates be utilized to monitor the proposed surcharge. Their locations should be similar to the supplemental borings beneath the building footprint.

Settlement Plates. Once the subgrade is prepared as described in our original report, settlement plates should be installed prior to the placement of the fill materials. A typical settlement plate detail is provided as Enclosure 2. The elevation of the settlement plate and riser should be determined ***prior to any fill placement*** using a benchmark sufficiently removed from the surcharge area so as not to be influenced by the fill. Once this initial elevation is determined, the plate should not be disturbed during fill placement and compaction. Hand compaction techniques may be required in the vicinity of the settlement plates to achieve this goal.

As fill is placed to achieve the desired site elevation, additional risers may be required to maintain the visibility of the settlement plate. The length of each additional riser should be accurately recorded for proper data evaluation. The frequency of monitoring will depend on the duration of the surcharge as well as observed settlements. However, we anticipate weekly readings to be sufficient.

Pile Foundations. All structural loads from the building (floor, walls, columns, etc.) should be supported on piles having the same approximate tip embedment below the existing ground surface in order to minimize differential settlement. Pile caps should be poured integrally with floor slabs and grade beams. Allowable pile load capacities and installation requirements for piles are provided in our original report.

Pile Embedment. The estimated allowable pile load capacities presented in our original report are given as depth below existing grade (approximate el 17.5 CD). Adjustments to the pile length should be considered for the various options and fill heights proposed. However, due to the potential installation requirements and drag loads, we do not recommend an increase in the estimated design capacity for the piles within the fill. Job pile order lengths should be based on the results of the test pile program. As noted in our original report, predrilling of the piles may be necessary to penetrate surficial fills and obstructions.

Effects of Fill Placement on Piles. As the fill settles from consolidation of the underlying subsoils, negative skin friction (drag loads) are induced on the piles as the soil settles along the pile. These drag loads may result in additional pile settlement and/or an increase in the load applied to the pile. Assuming the piles supporting the building are embedded in the underlying sand deposits, we do not anticipate significant settlement due to the placement of 2.5 to 3 feet of fill beneath the building. We anticipate ¼ inch or less of settlement due to the placement of 4 feet of fill at the building. Based on our analyses, we estimate ½ to ¾ inch of settlement due to the placement of a maximum of 8 feet of fill beneath the building. Please note the estimates of settlement for fill as previously provided in this report. These settlements should be considered to be differential to piles embedded in the sand deposits. Unless the site is preloaded, your design should account for the effects of this differential settlement.

However, piles firmly embedded in the sand strata should be evaluated for their structural adequacy. This evaluation should consider an additional compressive load of 5 tons (ultimate) due to the negative skin friction forces on the surface of the piles. This load should be added to the applied load at the pile butt. This total load should be used to evaluate the fiber stresses for timber piles near the pile tip. These values assume no preload is performed and may be neglected when piles are installed after the preload surcharge operations.

Please reference our original report for additional recommendations regarding pile group capacity and spacing, estimates of settlement due to structural loads, and installation requirements.

Limitations. Once site grading plans are finalized, Eustis Engineering should be contacted if the fill heights vary significantly from the furnished fill depth estimates. Also, we understand retaining walls are being considered for confinement of the fill. We have not evaluated the stability of unretained fill. Once the desired option is selected, Eustis Engineering should be contacted to provide an evaluation of fill slopes for the preload/surcharge. We anticipate slopes no steeper than 1 vertical on 3 horizontal, although flatter slopes may be required.

We hope this fulfills your immediate needs for the project. Should you require further information or clarification of this letter, please do not hesitate to contact us.

Yours very truly,

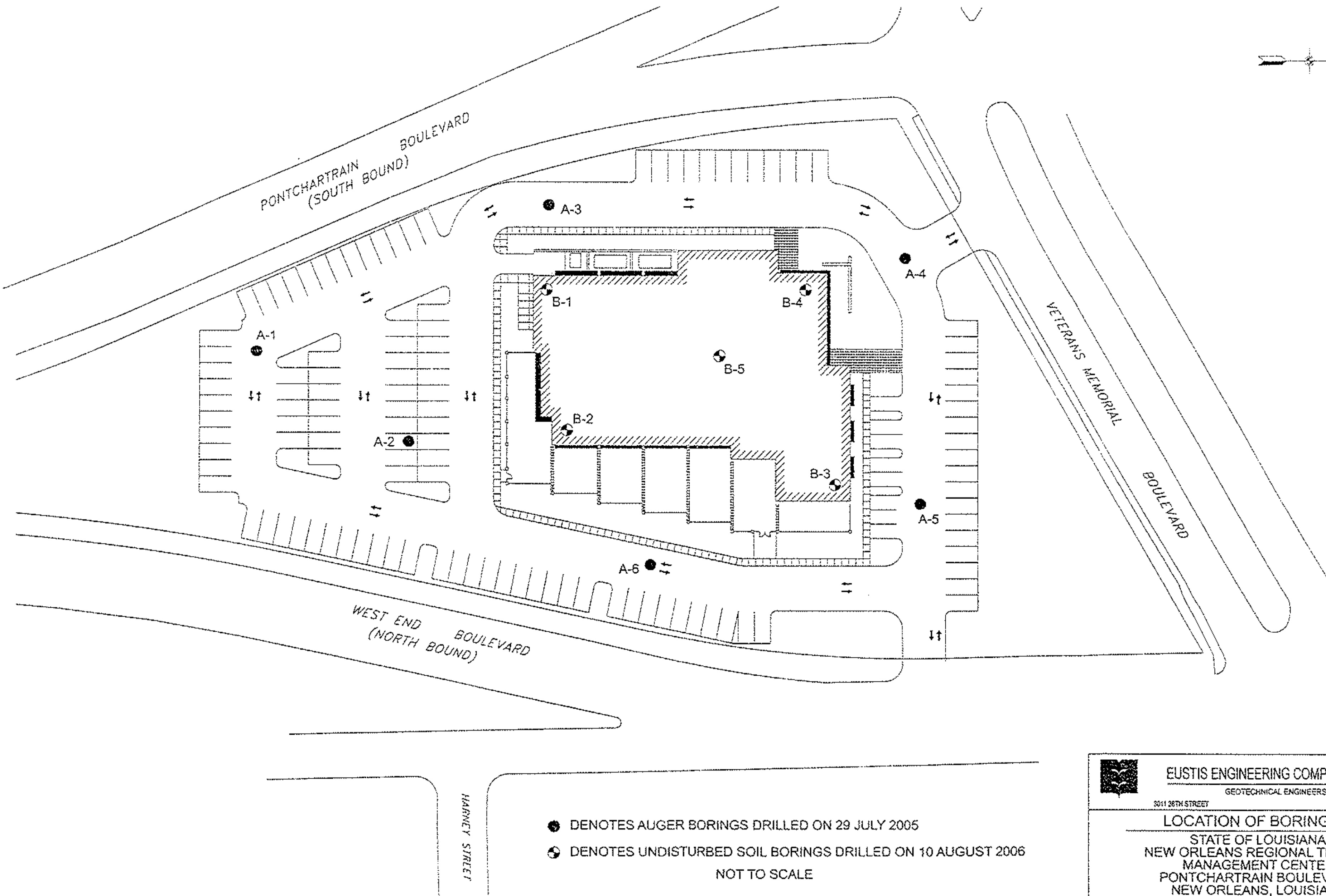
EUSTIS ENGINEERING COMPANY, INC.

GWENDOLYN PHILIPS SANDERS, P.E.

GPS:aln/nb

Enclosures 1 and 2
Appendices I and II

Copy w/Enclosures and Appendices to:
Schrenk & Peterson Consulting Engineers, Inc.
4141 Bienville Avenue
New Orleans, Louisiana 70119
Attention Mr. Edmund Schrenk
Email eschrenk@schrenkandpeterson.com



DENOTES AUGER BORINGS DRILLED ON 29 JULY 2005

DENOTES UNDISTURBED SOIL BORINGS DRILLED ON 10 AUGUST 2006

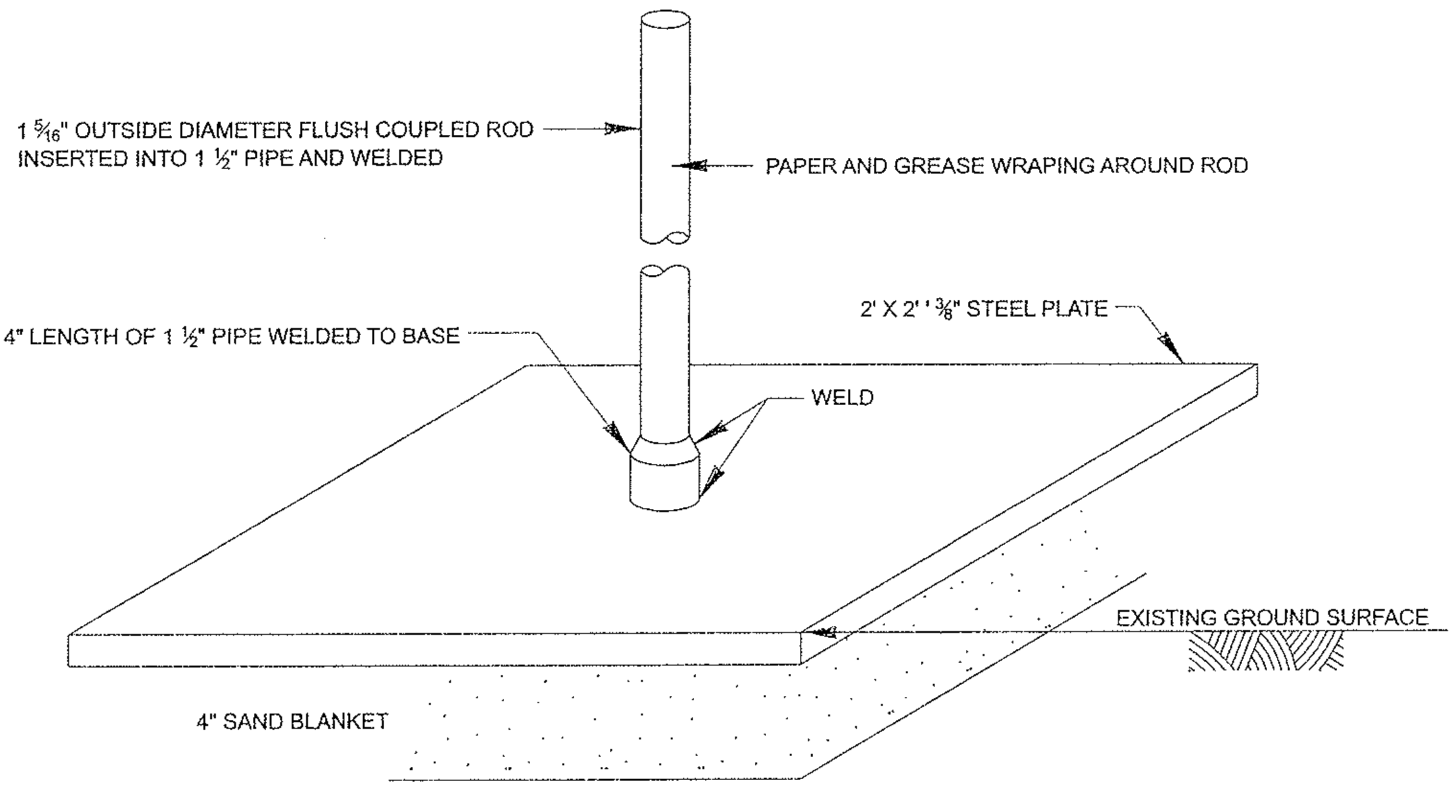
NOT TO SCALE

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28TH STREET METAIRIE, LOUISIANA

LOCATION OF BORINGS

STATE OF LOUISIANA
NEW ORLEANS REGIONAL TRAFFIC
MANAGEMENT CENTER
PONTCHARTRAIN BOULEVARD
NEW ORLEANS, LOUISIANA

DRAWN BY: J.L.S.	PLOT DATE: 22 AUG 06	CADD FILE: FIGURE1.DGN
CHECKED BY: G.P.S.	JOB NO.: 18803	ENCLOSURE 1



TYPICAL SETTLEMENT PLATE

EUSTIS ENGINEERING COMPANY, INC.
GEOTECHNICAL ENGINEERS
3011 28TH STREET METAIRIE, LOUISIANA

SETTLEMENT PLATE

STATE OF LOUISIANA
NEW ORLEANS REGIONAL TRAFFIC
MANAGEMENT CENTER
PONTCHARTRAIN BOULEVARD
NEW ORLEANS, LOUISIANA

DRAWN BY: J.L.S.	PLOT DATE: 27 SEPT 06	CADD FILE: ENCLOSURE2.DGN
CHECKED BY: G.P.S.	JOB NO.: 18803	ENCLOSURE 2

APPENDIX I

LEGEND AND NOTES FOR
LOG OF BORING AND TEST RESULTS

PP — Pocket penetrometer: Resistance in tons per square foot

SPT — Standard Penetration Test: Number of blows of a 140-lb hammer dropped 30 inches required to drive 2-in. O.D., 1.4-in. I.D. sampler a distance of 1 foot into the soil after first seating it 6 inches

SPLR — Type of Sampling: Shelby, SPT, Auger, No sample

SYMBOL — Clay, Silt, Sand, Peat/Humus, Shells, Stone/Gravel

Predominant type shown heavy; Modifying type shown light

USC — Unified Soil Classification

DENSITY — Unit weight in pounds per cubic foot

SHEAR TESTS

TYPE

- UC — Unconfined compression shear
- OB — Unconsolidated undrained triaxial compression shear on one specimen confined at the approximate overburden pressure
- UU — Unconsolidated undrained triaxial compression shear
- CU — Consolidated undrained triaxial compression shear
- DS — Direct shear

Ø — Angle of internal friction in degrees

c — Cohesion in pounds per square foot

ATTERBERG LIMITS

- LL — Liquid Limit
- PL — Plastic Limit
- PI — Plasticity Index

OTHER TESTS

- CON — Consolidation
- PD — Particle size distribution (sieve and/or hydrometer)
- k — Coefficient of permeability in centimeters per second
- SP — Swelling pressure in pounds per square foot

Other laboratory test results reported on separate figures

GENERAL NOTES

(1) If a ground water depth is shown on the boring log, these observations were made at the time of drilling and were measured below the existing ground surface. These observations are shown on the boring logs. However, ground water levels may vary due to seasonal fluctuations and other factors. If important to construction, the depth to ground water should be determined by those persons responsible for construction immediately prior to beginning work.

(2) While the individual logs of borings are considered to be representative of subsurface conditions at their respective locations on the dates shown, it is not warranted that they are representative of subsurface conditions at other locations and times.

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

STATE OF LOUISIANA
NEW ORLEANS REGIONAL TRAFFIC MANAGEMENT CENTER
PONTCHARTRAIN BOULEVARD
NEW ORLEANS, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: See Text Job No.: 18803 Date Drilled: 7/29/05 Boring: A-1 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0					Loose gray silty sand w/clay	SM	1	0-1	14						31	12	19		
							2	1-2											
					Soft to medium stiff gray sandy clay w/roots & shells	CL	3	2-3	16										
					Soft gray sandy clay w/silty sand & shell layers	CL	4	3-4											
							5	4-5											
5					w/roots & shells		6	5-6	23										
							7	6-7											
							8	7-8											
10																			
15																			
20																			
25																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

STATE OF LOUISIANA
NEW ORLEANS REGIONAL TRAFFIC MANAGEMENT CENTER
PONTCHARTRAIN BOULEVARD
NEW ORLEANS, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: See Text Job No.: 18803 Date Drilled: 7/29/05 Boring: A-2 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0					Loose brown clayey sand	SC	1	0-1											
							2	1-2	12										
							3	2-3											
					Soft brown sandy clay w/shells	CL	4	3-4	18										
							5	4-5											
5					Soft gray sandy clay w/fine sand layers	CL	6	5-6											
							7	6-7	63										
							8	7-8											
10																			
15																			
20																			
25																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

STATE OF LOUISIANA
NEW ORLEANS REGIONAL TRAFFIC MANAGEMENT CENTER
PONTCHARTRAIN BOULEVARD
NEW ORLEANS, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: See Text Job No.: 18803 Date Drilled: 7/29/05 Boring: A-3 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Soft brown silty clay w/roots	CL	1	0-1	26						50	19	31		
							2	1-2											
					Soft gray silty clay w/organic matter	CL	3	2-3	155										
							4	3-4											
					Soft gray clay w/roots & shell fragments	CH	5	4-5	97										
5							6	5-6											
							7	6-7											
					w/silty sand layers		8	7-8											
10																			
15																			
20																			
25																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

STATE OF LOUISIANA
NEW ORLEANS REGIONAL TRAFFIC MANAGEMENT CENTER
PONTCHARTRAIN BOULEVARD
NEW ORLEANS, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: See Text Job No.: 18803 Date Drilled: 7/29/05 Boring: A-4 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits Pi		Other Tests
0					Medium stiff to stiff brown & gray silty clay w/shells w/roots	CL	1	0-1											
							2	1-2	32										
					Medium stiff gray sandy clay w/shell fragments & roots	CL	3	2-3											
							4	3-4	27										
5					Soft gray silty clay	CL	5	4-5											
							6	5-6											
							7	6-7											
					Very soft gray & dark gray organic clay w/roots	OH	8	7-8	165										
10																			
15																			
20																			
25																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

STATE OF LOUISIANA
NEW ORLEANS REGIONAL TRAFFIC MANAGEMENT CENTER
PONTCHARTRAIN BOULEVARD
NEW ORLEANS, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: See Text Job No.: 18803 Date Drilled: 7/29/05 Boring: A-5 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Loose brown silty sand w/sand, shells, & gravel	SM	1	0-1	10										
							2	1-2											
							3	2-3	16										
							4	3-4											
							5	4-5											
5					Soft gray clay w/organic matter	CH	6	5-6											
							7	6-7	139										
							8	7-8											
10																			
15																			
20																			
25																			

Comments:

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

STATE OF LOUISIANA
NEW ORLEANS REGIONAL TRAFFIC MANAGEMENT CENTER
PONTCHARTRAIN BOULEVARD
NEW ORLEANS, LOUISIANA

Ground Elev.: Datum: Gr. Water Depth: See Text Job No.: 18803 Date Drilled: 7/29/05 Boring: A-6 Refer to "Legends & Notes"

Scale in Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Loose brown silty sand w/shells & gravel	SM	1	0-1	6										
					Soft gray & dark gray sandy clay w/shells & gravel	CL	2	1-2	24						54	15	39		
							3	2-3											
							4	3-4											
5					Soft gray sandy clay w/organic matter & roots	CL	5	4-5	97										
							6	5-6											
							7	6-7											
							8	7-8											
10																			
15																			
20																			
25																			

Comments:

APPENDIX II

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

STATE OF LOUISIANA
NEW ORLEANS REGIONAL TRAFFIC MANAGEMENT CENTER
PONTCHARTRAIN BOULEVARD
NEW ORLEANS, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 18803 **Date Drilled:** 8/10/06 **Boring:** 1 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0					Black organic clay	OH	1	0-0.04											
	3.00				Very stiff gray clay w/shell fragments	CH	2	1.5-2.5											
	2.50				Very stiff gray sandy clay w/wood	CL	3	4-5											
					Extremely soft gray clay w/sand lenses	CH	4	6.5-7.5	70	55	93	UC	--	65					
					Very soft gray organic clay	OH	5	9-10											
10					Very loose gray clayey sand w/roots & trace of wood	SC	6	11.5-12.5	28	91	116	OB	0	169					
		40			Dense gray sand w/clay	SP	7	12.5-14											
		32			Dense gray sand		8	15.5-17											
		34					9	18.5-20											
20																			
30																			
40																			
50																			

Comments: Latitude: 29° 59.938' N
Longitude: 90° 06.953' W

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

STATE OF LOUISIANA
NEW ORLEANS REGIONAL TRAFFIC MANAGEMENT CENTER
PONTCHARTRAIN BOULEVARD
NEW ORLEANS, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 18803 **Date Drilled:** 8/10/06 **Boring:** 2 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density		Shear Tests			Atterberg Limits				Other Tests
										Dry	Wet	Type	ø	C	LL	PL	PI		
0					Black clay w/grass	CH	1	0-0.04											
					Medium stiff gray sandy clay	CL	2	1.5-2.5											
					Very soft dark gray sandy clay w/shell fragments	CL	3	4-5	13	89	100	UC	--	187					
	1.00				Soft dark gray clay w/sand pockets	CH	4	6.5-7.5	65	58	96	UC	--	268					
					Very soft gray organic clay w/decayed wood	OH	5	9-10	125										
10		35			Dense gray sand	SP	6	10.5-12											
		34					7	13.5-15											
		32					8	16.5-18											
		32					9	18-20											
20																			
30																			
40																			
50																			

Comments: Latitude: 29° 59.934' N
Longitude: 90° 06.937' W

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

STATE OF LOUISIANA
NEW ORLEANS REGIONAL TRAFFIC MANAGEMENT CENTER
PONTCHARTRAIN BOULEVARD
NEW ORLEANS, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 18803 **Date Drilled:** 8/11/06 **Boring:** 3

Refer to "Legends & Notes"

Scale in Feet	PP	SPT	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0		12	Gravel & crushed asphalt	GP	1	0-0.04											
			Soft dark gray & gray organic clay w/decayed wood	OH	2	0.5-2											
	2.00				3	4-5	143	33	79	UC	--	306					
			Very soft gray organic clay w/roots	OH	4	6.5-7.5	117	38	82	UC	--	167					
					5	9-10											
10		8	Loose gray sand	SP	6	10.5-12											
		19	Medium dense gray sand	SP	7	13.5-15											
		15			8	16.5-18											
		18			9	18-20											
20																	
30																	
40																	
50																	

Comments: Latitude: 29° 59.965' N
Longitude: 90° 06.929' W

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

STATE OF LOUISIANA
NEW ORLEANS REGIONAL TRAFFIC MANAGEMENT CENTER
PONTCHARTRAIN BOULEVARD
NEW ORLEANS, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 18803 **Date Drilled:** 8/10/06 **Boring:** 4 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	ø	C	Atterberg Limits LL	PL	PI	Other Tests
0					Medium compact dark gray sandy silt w/shell fragments & roots	ML	1	0-0.04	11									
	1.75					SM	2	1.5-2.5	14									
					Medium dense dark gray silty sand w/shell fragments	OH	3	4-5	153	32	80	UC	--	150				
					Very soft dark gray & gray organic clay													
					Very soft gray clay w/organic matter	CH	4	6.5-7.5	82	52	94	UC	--					
10							5	9-10										
		4			Very loose gray clayey sand	SC	6	10-11.5										
		11			Medium dense gray sand	SP	7	13-14.5										
		18					8	15.5-17.5										
		34			Dense gray sand	SP	9	18.5-20										
20																		
30																		
40																		
50																		

Comments: Latitude: 29° 59.962' N
Longitude: 90° 06.958' W

EUSTIS ENGINEERING COMPANY, INC.

LOG OF BORING AND TEST RESULTS

STATE OF LOUISIANA
NEW ORLEANS REGIONAL TRAFFIC MANAGEMENT CENTER
PONTCHARTRAIN BOULEVARD
NEW ORLEANS, LOUISIANA

Ground Elev.: **Datum:** **Gr. Water Depth:** **Job No.:** 18803 **Date Drilled:** 8/10/06 **Boring:** 5 Refer to "Legends & Notes"

Scale In Feet	PP	SPT	SPLR	Symbol	Visual Classification	USC	Sample Number	Depth In Feet	Water Content Percent	Density Dry	Density Wet	Shear Tests Type	Shear Tests ø	Shear Tests C	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI		Other Tests
0					Brown organic clay w/roots & grass	OH	1	0-0.04											
	2.00				Medium stiff to stiff brown & gray clay w/fine sand pockets & shell fragments	CH	2	1.5-2.5	28	92	117	UC	--	1205					
	2.00						3	4-5											
					Soft gray sandy clay w/shell & brick fragments	CL	4	6.5-7.5	28	88	112	UC	--	285					
							5	9-10											
10		9			Loose gray sand w/clay & shell fragments	SP	6	10-11.5											
					Medium dense gray sand	SP													
		20					7	13.5-15											
		18					8	16.5-18											
		19					9	18.5-20											
20																			
30																			
40																			
50																			

Comments: